FIGURE 1

Rsrll

5'LTR   SV40   Neomycin   3'LTR

MCS (EcoRI,Hpal,Xhol,BamHI)

pLXSN vector

Replace SV 40 Promoter with an Internal Ribosome Entry Site (IRES)

Rsrll

5'LTR   IRES   Neomycin   3'LTR

MCS (EcoRI,Hpal,Xhol,BamHI)

pLXRN Retroviral Vector

Place Type II Hexokinase cDNA in the Antisense Orientation in the MCS

5'LTR   Hexokinase   IRES   Neomycin   3'LTR

EcoRI   Xhol

FIGURE 2


```
                                                                   917
1 ├──────────────────────────────────────────────────────────────┤
  ├─────────────────────────────────────────────────────────→ mutant type II
```
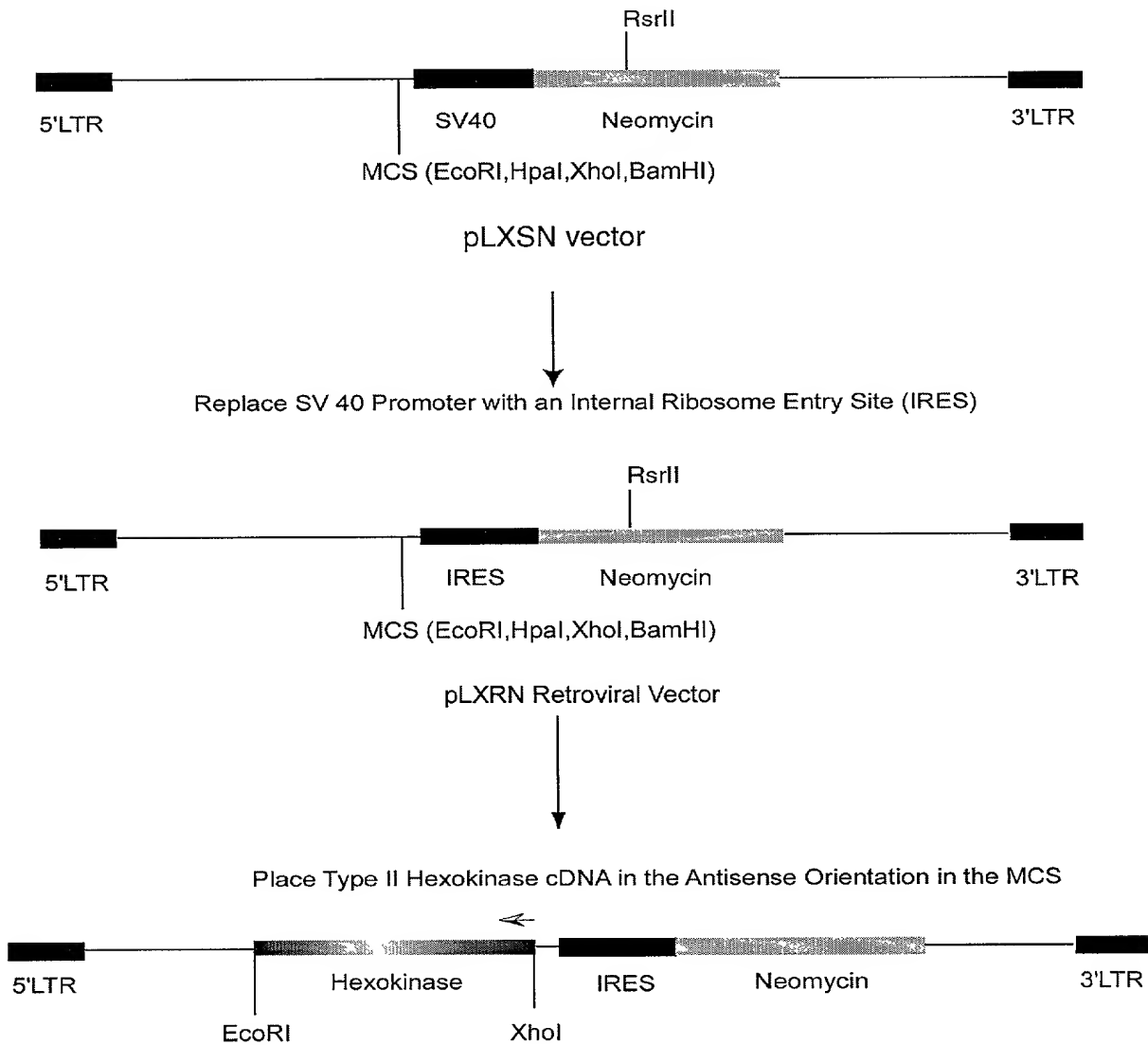
Legend:

━━━ – protein

Sequence:

```
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 61 VKMLPTFVRS TPDGTEHGEF LALDLGGTNF RVLRVRVTDN GLQRVEMENQ IYAILEDIMR

121 GSGTQLFDHI AECLANFMDK LQIKEKKLPL GFTFSFPCHQ TKLDESFLVS WTKGFKSSGV

181 EGRDVVDLIR KVIQRRGDFD IDIVAVVNDT VGTMMTCGYD DQNCEIGLIV GTGSNACYME

241 EMRHIDMVEG DEGRMCINME WGAFGDDGTL NDIRTEFDRE IDMGSLNPGK QLFEKMISGM

301 YMGELVRLIL VKMAKAELLF QGKLSPELLT TGSFETKDVS DIEEDKDGIE KAYQILMRLG

361 LNPLQEDCVA THRICQIVST RSASLCAATL AAVLWRIKEN KGEERLRSTI GVDGSVYKKH

421 PHFAKRLHKA VRRLVPDCDV RFLRSEDGSG KGAAMVTAVA YRLADQHRAR QKTLESLKLS

481 HEQLLEVKRR MKVEMEQGLS KETHAVAPVK MLPTYVCATP DGTEKGDFLA LDLGGTNFRV

541 LLVRVRNGKR RGVEMHNKIY SIPQEVMHGT GEELFDHIVQ CIADFLEYMG MKGVSLPLCF

601 TFSFPCQQNS LDQSILLKWT KGFKASGCEG EDVVTLLKEA IHRREEFDLD VVAVVNDTVG

661 TMMTCGYEDP HCEVGLIVGT GSNACYMEEM RNVELVDGEE GRMCVNMEWG AFGDNGCLDD

721 LRTVFDVAVD ELSLNPCKQR FEKMISGMYL GEIVRNILID FTKRGLLFRG RISERLKTRG

781 ISETKFLSQI ESDCLALLQV RAILRHLGLE STCDDSIIVK EVCTVVARRA AQLCGAGMAA

841 VVDKIRENRG LDNPKVTVGV DGTLYKLHPH FAKVMHETVR DLAPKCDVSF LESEDGSGKG

901 AALITAVACR IREAGQR
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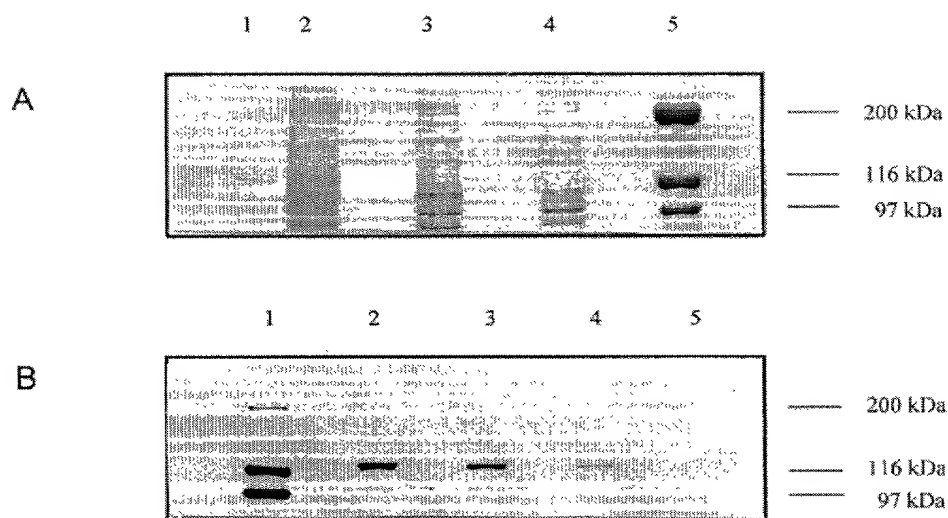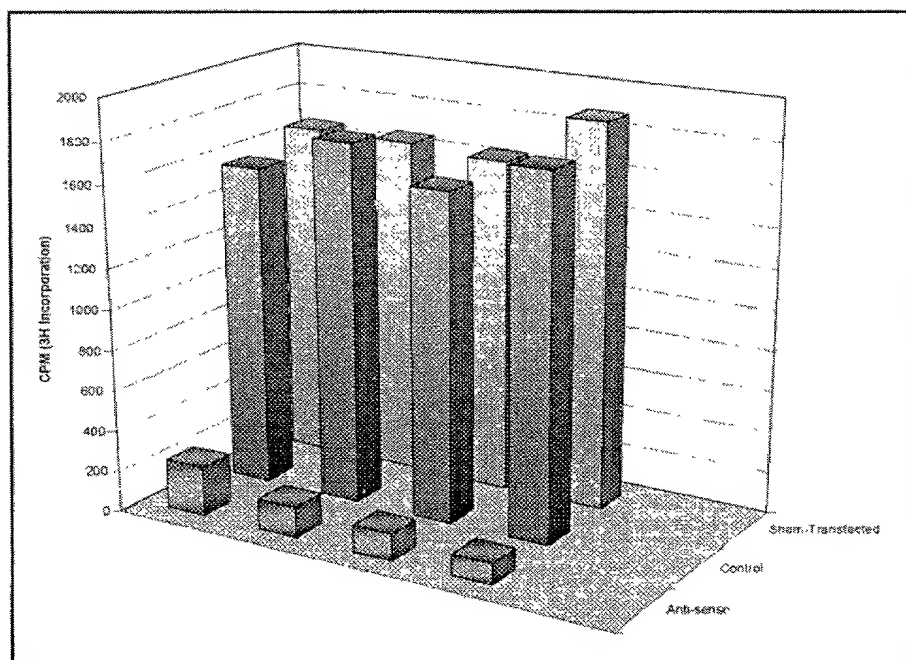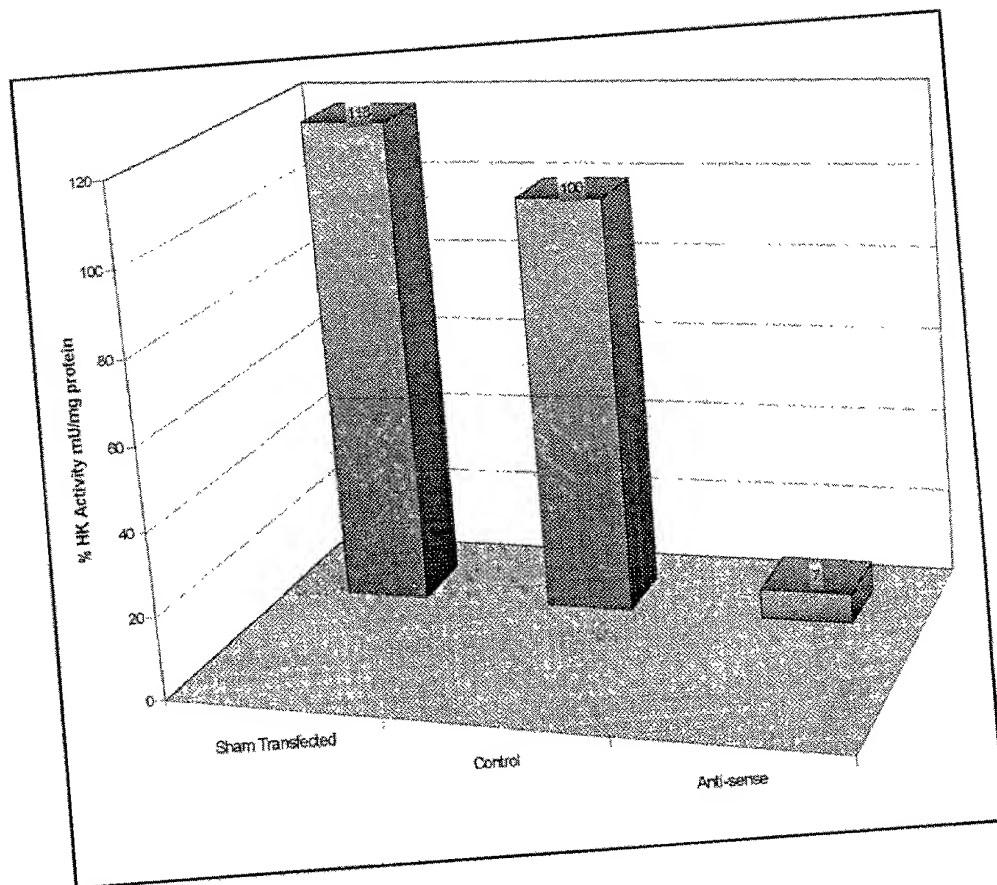
FIGURE 3

FIGURE 4

FIGURE 5

FIGURE 6

<u>AF027179</u> **Rattus norvegicus mutant type II hexokinase mRNA, complete cds**

```
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acaaaactgg atgagagttt tttggtctcg tggactaagg ggttcaagtc cagtggcgtg 541
gaaggcagag atgtggtgga cctgatccgg aaggttatcc agcgcagagg ggactttgac 601
attgacattg tggccgtggt gaatgacaca gttgggacca tgatgacttg tggctatgat 661
gatcagaact gcgagattgg tctcattgtg ggcactggca gcaacgcctg ctacatggag 721
gaaatgcgtc atattgacat ggtggaggga gatgaggggc gcatgtgcat caacatggag 781
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gcagctctca tcactgccgt ggcctgccgc atccgggagg ctgggcagag atag
```

FIGURE 7A

AF113968 Cloning vector pLXRN, complete sequence

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```

FIGURE 7C

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6421 atcacgaggc cctttcgtct tcaa
```

FIGURE 8A

Accession Number NM_012734 for Rattus norvegicus Hexokinase 1 (Hk1), mRNA

```
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cgccttcggt gacaatgggt gtctggatga catcagaaca gactttgaca aagtggtgga 2281
cgaatattct ctaaactctg ggaaacaaag gtttgagaaa atgatcagtg ggatgtacct 2341
gggtgagatc gtccgtaaca tcctgattga cttcaccaag aaaggcttcc tcttccgggg 2401
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tgagagtgac cggttagcgc tgctccaggt gcgggccatc cttcagcagc tgggtttgaa 2521
cagcacgtgt gacgacagta tcctggtcaa gaccgtgtgt ggggtggtgt ccaagagggc 2581
ggctcagctg tgtggtgccg gcatggccgc cgtggtggaa aagatcagag agaacagagg 2641
cctagaccat ctgaatgtaa ctgtgggagt ggatgggacg ctctacaaac ttcatccaca 2701
cttctccaga atcatgcacc aaactgtgaa ggaactgtca ccaaagtgta ccgtgtcctt 2761
cctcctgtct gaagacggca gcggcaaggg ggccgccctt atcacagctg tgggcgtgcg 2821
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ctgggagacc cagccagcgc ccactccgcc gcagcagagg gaggaagggg accgcagtaa 3001
cggagcacca cgtagaatac cacccagagc gcgtgtgctg ttgatctgat ctctcgcctg 3061
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```

FIGURE 8B

```
ccatgagtga acgtagcggc accccggtgc gtctactgca gatgtccagc taggaaagag 3181
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ccgaattctt tagtgagcca ttgttgtacg tctagtaaac tttgtactga ttc
```